

Express Mail Label No. EV396081899US

[0001] BATTERY OPERATED WATER GUN WITH ELECTRONIC POWER METER

[0002] CROSS REFERENCE TO RELATED APPLICATION(S)

[0003] This application claims the benefit of U.S. provisional application no. 60/454,910 filed on March 14, 2003, which is incorporated by reference as if fully set forth.

[0004] BACKGROUND

[0005] The present invention is directed to a toy water gun, and more particularly to a water gun having a water storage reservoir that is pressurized with compressed air. The pressurized water is selectively released from the reservoir through a nozzle in a narrow stream.

[0006] The water gun industry is competitive, and a number of pressurized guns have been successfully introduced to the market. The majority of these water guns use a hand pump connected to the gun that forces compressed air into the water tank. A trigger selectively releases the pressurized water. The trigger is connected to a pinch tube release mechanism or a cup valve that can be snapped open.

[0007] Further improvements upon these types of water guns have included pressurizing the water guns using a charging mechanism connected to a pressurized water source, such as a water spigot or garden hose. However, a problem with all of these known water guns is that their use is limited to older children or adults having sufficient strength to either hand pump the water gun in order to pressurize the tank or hold the water gun charging mechanism against the water system pressure so that they can be charged with pressurized water. This is often difficult if not impossible for small children and/or people with limited strength or dexterity.

[0008] SUMMARY

[0009] The present invention is directed to an air-pressurized water gun comprising a housing having a water tank mounted thereon; an air pump mounted on the housing and in fluid communication with the tank; a battery connected to the housing and in electrical communication with the pump; actuation means for providing power from the battery to the pump such that compressed air is transferred from the pump into the tank; and an avenue of release between the tank and a nozzle, with a selectively actuatable valve located along the avenue of release to allow the discharge of pressurized fluid from within the tank.

[0010] In the preferred embodiment, a pressure sensor is connected to the tank and senses the pressure within the tank. Preferably, an electronic visual indicator is provided to show a user the level of pressure within the tank. In the preferred embodiment, this is provided via a series of color coded lights, indicating a pressure charge level.

[0011] Preferably, a second actuator switch is provided on the water gun housing that activates the pump. Preferably, once the pump has been activated, it continues to run until a desired pressure level is built-up within the tank. The pump is then automatically turned off.

[0012] BRIEF DESCRIPTION OF THE DRAWING(S)

[0013] The invention will be more fully understood when viewed in conjunction with the attached drawings. In the drawings:

[0014] Figure 1 is a right-side elevational view of a water gun in accordance with the present invention; and

[0015] Figure 2 is a left-side elevational view shown with the housing partially broken away to illustrate the inner mechanisms of the water gun.

[0016] DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0017] Referring to Figure 1, a water gun in accordance with the present invention is shown. The water gun 10 includes a housing 12 having a handle 14 that can be gripped by a user. A water tank 16 is connected to the housing and includes an external fill port 18 that is closed with a cap 20. A nozzle 22 is located at a front end of the housing 12 from which water is ejected. A trigger 24, located adjacent to the handle 14, is used to selectively release water from the water gun 10.

[0018] In contrast with the prior known water guns, the water gun 10 includes a powered air pump 30 mounted thereon. The pump 30 is preferably a piston or diaphragm pump driven via an electric motor (not separately shown). A battery pack 32 is connected to the housing, which holds batteries for providing power to the pump 30 preferably below the handle and arranged so that the weight of the batteries is distributed to maintain balance by being wider than the handle 14. A pump actuator switch 34 is also located on the housing 12, preferably adjacent to the handle 14. The pump actuator switch 34 turns the pump 30 on so that air is drawn from outside the water gun and pumped into the tank 16 such that water in the tank 16 is placed under pressure.

[0019] Preferably, a master on-off switch 14 is mounted to the housing 12, which can be used to cut off electric power to all of the water gun systems.

[0020] An electronic power meter 40 located on the housing includes a plurality of lights, preferably of different colored LEDs, that show a pressure level within the tank 16. The lights 42 change colors with changes in pressure within the tank 16. In the preferred embodiment, upon actuation of the switch 34, power is provided to the pump 30, which continues to pump air into the tank 16 until a desired pressure limit is reached, preferably about 40 psi, whereupon the pump is deactivated. The charge (pressure) level within the tank is indicated as low by a red light 42, intermediate by a yellow light 42, and fully pressurized by a green light 42.

[0021] Pressing the trigger 24 ejects water from the tank 16 through the nozzle. The pump 30 can also be actuated while the trigger 24 is pressed so that the pressure in the tank 16 is depleted less rapidly.

[0022] Figure 2 shows the inner mechanisms of the water gun 10 in detail. The air pump 30 is connected to the tank 16 via a first passageway 52 connected to a pressurizing inlet 54 on the water tank 16. The water tank 16 includes an outlet 56 connected via a second passageway 58 to the nozzle 22. A manually actuatable valve 60 is located along the passageway 58. The valve 60 includes an actuator rod 62 connected via a linkage 64 to the trigger 24. The trigger 24 selectively opens the valve 60 so that pressurized water from within the tank 16 is discharged through the second passageway 58 and out the nozzle 22. The valve 60 is preferably a ball valve. However, other suitable types of valves may be used.

[0023] In order to pressurize the tank 16, the pump 30 is actuated by first turning the master switch 14 to "on." The master switch 14 is connected in series with the batteries 33 located within the battery compartment 32 and the electrical systems in the water gun 10. With the master switch 14 in the on position, upon actuating the lever 34, a pump actuation switch 70 turns on the power to the pump 30 and the electronic power meter 40. The pump 30, which is preferably a small electric motor driven pump, draws air from outside the tank 16 and pressurizes the tank 16 via the first passageway 52. Preferably, a pressure sensor 72 is connected to the passageway 52 or is otherwise in full communication with the tank 16 in order to sense the pressure within the tank 16. The sensor 72 may be a mechanically actuated diaphragm or an electronic pressure transducer that senses the pressure within the tank 16. Based upon the pressure, different lights 42 on the electronic power meter 40 are lit in order to indicate the pressure level within the tank between various states indicating uncharged, half-charged and fully charged. Preferably, a check valve 74 located between the pump 30 and the tank 16 somewhere along the passageway 52 to prevents a backflow of water from within the tank 16 to the pump 30.

[0024] Upon actuation of the switch 70, the pump 30 continues to run until a maximum pressure is reached. This pressure is sensed by the pressure sensor 72 or an internal sensor within the pump 30 so that the tank 16 is not over pressurized.

[0025] Once the water within the tank 16 is pressurized with air from the pump 30 to a maximum pressure level, the pump 30 stops and the electronic power meter 40 indicates that a fully charged state has been reached, preferably by showing a green light. Manually pulling the trigger 24 opens the valve 60 such that pressurized water within the tank 16 is allowed to flow through the second passageway 58 and out through the nozzle 22.

[0026] The water gun 10 is advantageous because manual pumping or holding the water gun against a high pressure water source is not required; these are often difficult for smaller children and those with impaired strength and/or dexterity. Thus, the water gun 10 can be used by children of most ages or by others with impaired strength and/or dexterity, which often makes it difficult to use and enjoy the known air-pressurized water guns.

[0027] While the present invention has been described in a preferred embodiment, the invention is not limited to the specific embodiment described, which should be considered as merely exemplary. Further modifications and extensions of the present invention may be developed, and all such modifications are deemed to be within the scope of the present invention as defined by the appended claims.

*

*

*